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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention divides the inside of a plane into a stator room and a rotator room by the can, and relates to the motor applied to the canned motor which circulates cooling water in a rotator room and cooled a rotator and bearing.

[0002]

[Description of the Prior Art] A motor flange is the fragmentary sectional view which is combined with the pump section (not shown) and in which showing the conventional canned motor as an object for a pump drive, in drawing, 1 is a stator and drawing 6 consists of a stator iron core 2 equipped with the stator winding 3, and a frame 4 which fixed this stator iron core 2. 5 is the lead wire of a stator winding 3. 6 -- a rotator -- it is -- a rotator -- it consists of rotor axis 10 which the conductor 8 fixed and fixed the rotator iron core 7 joined in the ring 9, and this rotator iron core 7 Through-hole 10a is prepared in the axial center at rotor axis 10. The rotator iron core 7 has countered the stator iron core 2 through an air gap g.

[0003] the bracket which 11 fixed with the bolt 12 on the frame 4 -- it is -- water flow -- a hole -- 11a is prepared 13 is the can of the shape of a cylinder which consists of non-magnetic metal material (for example, stainless steel material) of ultra-thin thickness, and the pars intermedia of this can 13 is inserted in the bore section of the stator iron core 2. Watertight junction of the end section of a can 13 is carried out through O ring 14 at the end circles of a frame 4, and the other end is carrying out watertight junction through O ring 15 into the bracket 11. 16, the sleeve bearing to which 17 supports rotor axis 10 to radial, the thrust disk which 18 fixed to rotor axis 10, and 19 are the thrust bearing supporting thrust loading of rotor axis 10. The cap for air vents to whom it protested against 20 centering on the edge of a frame 4, and 21 are the terminal boxes attached in the frame 4 through the rubber mould airtight lead wire 41.

[0004] Drawing 7 is the cross section of a terminal box 21 shown in drawing 6, a terminal box 21 consists of a metaled press-forming article, and consists of a terminal box seat 22 and covering 23, and this terminal box 21 has fixed it with the bolt 25 through the rubber mould airtight lead wire 41 to mouth delivery-volume hole 4a of a frame 4. the rubber mould airtight lead wire 41 -- lead wire 43 -- a rubber mould -- it is formed by carrying out a mould by the member 44, and the pressure connection terminal 26 is attached at the nose of cam of lead wire 43 the shape of a cop with shallow 45 -- a rubber mould -- it is the presser foot attached in the periphery section of a member 44 27 is the terminal block attached in the terminal box seat 22, it binds a pressure connection terminal 26 and the piece 28 of connection tight with a bolt 29, and made it connect, and has concluded the terminal (not shown) and the piece 28 of connection of a power cable which were drawn with the bolt 30. 22a is the hole for level luffing motion of a power cable.

[0005] The installation to the pump of the above-mentioned conventional canned motor and operation are explained. First, a cap 20 is removed after combining with a pump, and temporary operation of the canned motor is carried out. thereby -- the pressure of a pump -- going up -- a part of pumping -- as cooling water -- water flow of a bracket 11 -- the rotator room from hole 11a -- flowing -- the crevice between a can 13 and the rotator iron core 7 -- a passage -- internal air -- the exterior -- discharging -- there -- a cap 20 -- a frame 4 -- it screws on centering on an edge Cooling water passes along circulation slot 4b formed in the edge bore section of a frame 4, and returns to the inlet port (low-tension side) of a pump through through-hole 10a of rotor axis 10. Thus, the stator iron core 2 which touches a can 13, a rotator 6 and cooling of each bearing, and the lubrication of bearing are performed by the cooling water which circulates a rotator room.

[0006] Since the lead wire 5 of a stator winding 3 is pulled out through the rubber mould airtight lead wire 41 from mouth delivery-volume hole 4a of a frame 4, the hermetic seal of the stator room is carried out, and it does not have circulation with the open air. Therefore, although the temperature of a can 13 or the stator iron core 2 becomes lower than an OAT when the temperature of the circulating cooling water operates a rotator room on low conditions considerably from an OAT, dew condensation still does not occur in the stator interior of a room, but there are no worries about the shutdown by the fall of insulation resistance and the short circuit. Moreover, temperature, such as a stator winding 3 and a frame 4, receives the temperature effects of the cooling water which circulates a rotator room, and it is hardly influenced of outside air temperature.

[0007]

[Problem(s) to be Solved by the Invention] In the canned motor constituted as mentioned above, when the temperature of the securing bolt 25 of the terminal box seat 22 or the terminal box seat 22 became lower than an OAT, of course and the conditions that the humidity of the open air was high were added, into the terminal box 21, dew condensation occurred, the

insulation resistance in lead-wire 43 grade fell, and when the temperature of cooling water was operated very much on low conditions from an OAT, since the temperature of a frame 4 was a short circuit, it had the technical problem that operation had to be stopped.

[0008] This invention was made in order to solve this technical problem, and it aims at obtaining the motor which prevents generating of dew condensation in a terminal box.

[0009]

[Means for Solving the Problem] The motor of the claim 1 of this invention is attached in the terminal box seat which supports a terminal block while forming the space section between frames and having fixed the terminal box on the frame, and this terminal box seat, and constitutes the aforementioned terminal block from wrap covering.

[0010] the circulation to which the motor of the claim 2 of this invention circulates air between the exterior of a frame, and space circles to the terminal box seat of a claim 1 -- a hole is formed

[0011] The motor of the claim 3 of this invention is attached in the 2nd terminal box seat which supports a terminal block, and this 2nd terminal box seat, and constitutes a terminal block from wrap covering while it formed the space section between the 1st terminal box seat which formed the space section between frames and has fixed the terminal box on the frame, and this 1st terminal box seat and has fixed to the 1st terminal box seat.

[0012] the circulation to which the motor of the claim 4 of this invention circulates air between the exterior of a frame, and space circles, respectively to the 1st terminal box seat of a claim 3, and the 2nd terminal box seat -- a hole is formed

[0013] The heat pipe which the motor of the claim 5 of this invention is attached in the terminal box seat which supports a terminal block while forming the space section for the terminal box between frames, and sealing the stator room in a frame and having fixed on the frame, and this terminal box seat, and constitutes a terminal block from wrap covering, and makes space circles the same as that of the temperature of the open air at a terminal box seat is inserted.

[0014] In a frame according to claim 1 to 5 and a terminal box seat, the motor of the claim 6 of this invention uses a resin bolt for a frame, and fixes a terminal box seat.

[0015] The motor of the claim 7 of this invention forms a weep hole in a crevice while carrying out position decision of the head of a metal bolt to the crevice of a terminal box seat.

[0016]

[Function] In the motor of the claim 1 of this invention, since the space section was formed by the terminal box seat, the touch area of a frame and a terminal box becomes small, the thermal resistance between a frame and a terminal block becomes large, to the open air, a terminal block does not become low temperature from an OAT so much, but the temperature of a frame can prevent generating of dew condensation by the terminal block also in the time of a low.

[0017] the circulation which circulates air between the exterior of a frame, and space circles to the terminal box seat of a claim 1 in the motor of the claim 2 of this invention -- since the hole was formed -- circulation -- through a hole, the temperature of space circles becomes almost the same as that of an OAT, and a terminal block becomes the almost same temperature as an OAT, and it can prevent generating of dew condensation by the terminal block

[0018] In the motor of the claim 3 of this invention, by having formed the two space sections between the frame and the terminal block As compared with the motor of a claim 1, the thermal resistance between a frame and a terminal block becomes large further, to the open air, a terminal block does not become low temperature from an OAT so much, but the temperature of a frame can prevent generating of dew condensation by the terminal block more also in the time of a low as compared with the motor of a claim 1.

[0019] the circulation which circulates air between the exterior of a frame, and space circles in the motor of the claim 4 of this invention, respectively to the 1st terminal box seat of a claim 3, and the 2nd terminal box seat, since the hole was formed circulation -- through a hole, the temperature of space circles becomes almost the same as that of an OAT, and can prevent generating of dew condensation by the terminal block more conjointly with increase of the thermal resistance between a frame and a terminal block as compared with the motor of a claim 1

[0020] In the motor of the claim 5 of this invention, since the space section was formed between frames by the terminal box seat and the stator room in a frame was sealed, it is not necessary to prepare the seal member for sealing a stator room and, space circles become the same as that of the temperature of the open air with a heat pipe, and generating of dew condensation by the terminal block can also be prevented.

[0021] In the motor of the claim 6 of this invention, since it used for the frame with the resin bolt and the terminal box seat was fixed, transfer of the heat through the resin bolt between a frame and a resin bolt is small.

[0022] In the motor of the claim 7 of this invention, since the weep hole was formed in the crevice while carrying out position decision of the head of a metal bolt to the crevice of a terminal box seat, the dew produced in the head of a metal bolt is brought together in a crevice, and is discharged outside through a weep hole from there.

[0023]

[Example]

One example of this invention is explained about drawing below example 1. Drawing 1 is the sectional side elevation showing one example of this invention, the same as that of drawing 6 and drawing 7 or a considerable portion attaches the same sign, and the explanation is omitted. In drawing, 121 is the terminal box which consisted of a terminal box seat 122 which is resin mold goods, and covering 123, and this terminal box 121 has fixed with the low resin bolt 125 of thermal conductivity through the rubber mould section 144 of the rubber mould airtight lead wire 141 attached in mouth delivery-volume hole 104a of a frame 104. 122a is the impression section formed in the terminal box seat 122 so that the rubber mould section 144 may

be wrapped in, and the depth of this impression section 122a has the value somewhat smaller than the thickness of the rubber mould section 144, and forces the rubber mould section 144 on a frame 104 side by bolting of the resin bolt 125. the space section by which 122b was formed between the terminal box seat 122 and the frame 104, and the circulation which 122c is formed in the side of the terminal box seat 122, and opens space section 122b and the open air for free passage -- a hole and 123a are formed in covering 123, and are a hole for power-cable drawing in

[0024] Since space section 122b was formed in order to fabricate the terminal box seat 122 by the resin with small thermal conductivity and to make the touch area between both small between the terminal box seat 122 and a frame 104 in the above-mentioned canned motor the circulation which conduction of the cold energy from the frame 104 to the terminal box seat 122 does not almost have, and leads to the open air further at the terminal box seat 122 -- a hole -- the internal temperature in a terminal box 121 becomes almost the same as an OAT, and it is hard coming to generate dew condensation in a terminal box 121 by having formed 122c. Moreover, the rubber mould section 144 of the rubber mould airtight outlet line 141 is suppressed at the frame 104 side, and the airtightness of the stator interior of a room is also secured certainly.

[0025] Example 2. drawing 2 is the fragmentary sectional view showing other examples of this invention, and 222 is piled up on the 1st terminal box seat 122. The 2nd terminal box seat which fixed with the resin bolt 125 on the frame 104 with the 1st terminal box seat 122 with the resin bolt 125, the space section by which 222a was formed between the 1st terminal box seat 122 and the 2nd terminal box seat 222, and the 2nd circulation which 222b is formed in the side of the 2nd terminal box seat 222, and opens space section 222a and the open air for free passage -- it is a hole

[0026] Since the 2nd terminal box seat 222 was further piled up on the 1st terminal box seat 122 to the example 1 in the case of this example, the heat transfer area between a frame 104 and a terminal box 221 becomes still smaller, the influence of the cold energy from a frame 104 decreases [ a terminal box 221 ] further, and it is much more hard coming to generate dew condensation within a terminal box 221.

[0027] Example 3. drawing 3 is the fragmentary sectional view showing the example of further others of this invention, and the 1st metal bolt with which 225 fixes the 1st terminal box seat 122 on a frame 104, and 325 are the 2nd metal bolt for fixing the 2nd terminal box seat 222 to the 1st terminal box seat 122.

[0028] In the case of this example, the 1st terminal box seat 122 is fixed on the frame 104 using the 1st metal bolt 225 with high intensity, the rubber mould section 144 of the rubber mould airtight outlet line 141 can be strongly pressed to a frame 104 side, and the airtightness of the stator interior of a room is secured more certainly. Moreover, the 2nd terminal box seat 222 is fixed to the 1st terminal box seat 122 using the 2nd metal bolt 325 with high intensity, and the 1st terminal box seat 122 and the 2nd terminal box seat 222 are combined firmly.

[0029] In the example 4. above-mentioned examples 1 and 2, although the head of the resin bolt 125 which fixes the terminal box seats 122 and 222 is manufactured by the product made of a resin so that dew condensation may not occur, about the bolt which combines a grounding terminal and a frame 104, since energization nature is required, a metal fake colander cannot be obtained, and, for the reason, generating of dew condensation in the head of this bolt cannot be prevented. Drawing 4 is the fragmentary sectional view showing the example made as a cure against dew condensation produced on the head of a metal bolt, as for a grounding terminal and 51, 50 is [ the piece of ground connection and 52 ] metal bolts, and the grounding terminal 50 and the frame 4 are electrically connected through the piece 51 of ground connection, and the metal bolt 52. The head of the metal bolt 52 and the edge of the piece 51 of ground connection are positioned at 122d of crevices of the terminal box seat 122, and weep hole 122e is formed in 122d of the crevice.

[0030] In the case of this example, the dew condensation which occurred in the head of the metal bolt 52 gathers in 122d of crevices, and is smoothly discharged outside through weep hole 122e and space section 122b style through-hole 122c.

[0031] the seal with which packing and 63 carry out a plain washer and, as for 64, the terminal box seat of the shape of an enclosed type to which example 5. drawing 5 is the fragmentary sectional view showing the example of further others of this invention, and 322 seals the stator room in a frame 204, the heat pipe with which 60 makes the same temperature of the open air and the inside of the terminal box seat 322, and 61 and 62 carry out the seal of between lead wire 43 and the terminal box seats 322 -- it is a member

[0032] In the case of this example, the airtightness of the stator interior of a room is secured by the terminal box seat 322, and with a heat pipe 60, the temperature of the terminal box seat 322 interior is almost the same as the open air, the internal temperature in a terminal box 121 also becomes almost the same as an OAT, and it is hard coming to generate dew condensation in the terminal block 27 in a terminal box 121. In addition, although each example explained the canned motor as a motor, of course, it is applicable also to things other than this.

[0033]

[Effect of the Invention] It is effective in the touch area of a frame and a terminal box becoming small since the space section was formed by the terminal box seat according to [ as explained above ] the motor of the claim 1 of this invention, the thermal resistance between a frame and a terminal block becoming large, and, as for a terminal block, the temperature of a frame not turning into low temperature more so much than an OAT in the time of a low to the open air, but being able to prevent generating of dew condensation by the terminal block in a terminal box.

[0034] moreover, the circulation which circulates air between the exterior of a frame, and space circles to the terminal box seat of a claim 1 according to the motor of the claim 2 of this invention -- since the hole was formed -- circulation -- the temperature of space circles becomes almost the same as that of an OAT, and the terminal block in a terminal box becomes the almost same temperature as an OAT, and it is effective in the ability to be able to prevent generating of dew condensation by the terminal block through a hole

[0035] According to the motor of the claim 3 of this invention, moreover, by having formed the two space sections between the frame and the terminal block As compared with the motor of a claim 1, the thermal resistance between a frame and a terminal block becomes large further. It is effective in the ability of the temperature of a frame to prevent generating of dew condensation by the terminal block more certainly to the open air as compared with a motor according to claim 1 by a terminal block not becoming low temperature from an OAT so much in the time of a low.

[0036] moreover, the circulation which circulates air between the exterior of a frame, and space circles, respectively to the 1st terminal box seat of a claim 3, and the 2nd terminal box seat according to the motor of the claim 4 of this invention, since the hole was formed circulation -- through a hole, the temperature of space circles becomes almost the same as that of an OAT, and is effective in the ability to prevent generating of dew condensation by the terminal block more certainly conjointly with increase of the thermal resistance between a frame and a terminal block as compared with the motor of a claim 1

[0037] Moreover, since according to the motor of the claim 5 of this invention the space section was formed between frames by the terminal box seat and the stator room in a frame was sealed, it is not necessary to prepare the seal member for sealing a stator room and, space circles become the same as that of the temperature of the open air with a heat pipe, and it is effective in the ability to also prevent generating of dew condensation by the terminal block in a terminal box.

[0038] Moreover, since according to the motor of the claim 6 of this invention the resin bolt was used and the terminal box seat was fixed on the frame in the motor according to claim 1 to 5, the rate which the cold energy from a frame conducts to a terminal box seat through a resin bolt, for example becomes small, and can heighten more a claim 1 or an effect according to claim 5.

[0039] Moreover, since according to the motor of the claim 7 of this invention the weep hole was formed in the crevice while carrying out position decision of the head of a metal bolt to the crevice of a terminal box seat, the dew produced in the head of a metal bolt is brought together in a crevice, is smoothly discharged outside through a weep hole from there, and is effective in the ability to stop low the bad influence by dew condensation within a terminal box.

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[Translation done.]